UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/649,869	08/28/2003	Takehisa Takagi	TAGAKI11	6355

1444 7590 03/07/2007
BROWDY AND NEIMARK, P.L.L.C.
624 NINTH STREET, NW
SUITE 300
WASHINGTON, DC 20001-5303

EXAMINER	
LEWIS, BEN	
ART UNIT	PAPER NUMBER
1745	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/649,869	TAKAGI ET AL.	
	Examiner	Art Unit	
	Ben Lewis	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-11 is/are pending in the application.

4a) Of the above claim(s) 6-11 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-5 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 28 August 2003 is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on January 12th, 2007 has been entered. Claim 1 has been amended. Claims 6-11 were withdrawn.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenyon et al. (U.S. Patent No. 6,423,437 B1) and further in view of Lee et al. (U.S. Pub. No. 2003/0219635 A1).

With respect to claims 1 and 6, Kenyon et al. disclose a passive air breathing fuel cell wherein the polymer electrolyte fuel cell of the present invention includes a plurality of fuel cell units arranged along a common central axis in a stack. The fuel cell units

may be formed in a conventional manner, and each includes a polymer electrolyte membrane. The stacked fuel cell units have an inner periphery defining a fuel flow channel through which fuel can flow in an axial direction. An electrically conductive current collector is electrically connected to an anode of a fuel cell unit at one end of the stack and an electrically conductive current collector is electrically connected to the cathode of a fuel cell unit at another end of the stack. A fuel supply inlet is positioned at one end of the stack to direct fuel therethrough to the flow channel (Col 2 lines 15-30). This type of passive fuel cell has a stack of fuel cell units **11** which are held together in the stack by end plates **12** and **13**. A bolt **15** extends through a central fuel supply channel **16**, and nuts **17** and **18** are threaded onto the ends of the bolt **15** into engagement with the end plates **12** and **13**, respectively, to press on the end plates, thereby compressing the stack of fuel cell units **11** and holding the stack together. An upper current collector plate **20** is mounted in the stack between the end plate **12** and the uppermost fuel cell unit **11** in the stack, and a bottom current collector plate **21** is mounted between the bottom end plate **13** and the lowest fuel cell unit **11** in the stack (Col 3 lines 45-67). As also shown in the more detailed view of FIG. 3, the bottom nut **48** is threaded onto the threaded bottom end **70** of the bolt **46** into engagement with the end plate **44**, with an O-ring **71** seated in a groove in the nut **48** to provide an airtight seal between the end plate **44** and the nut **48** (Col 6 lines 45-55). If desired, a center manifold **75** may be mounted within the fuel flow channel **35** around the bolt **46** to distribute fuel and to help distribute moisture evenly through the length of the flow channel **35** (Col 7 lines 1-15). Kenyon et al. do not specifically teach wherein the

oxygen passage plate comprises a plurality of opened grooves on a surface thereof opposed to the oxygen electrode, and the grooves are opened outside at both ends thereof. However Lee et al. discloses a cooling system for a fuel cell stack wherein the electrically conductive plates sandwiching the MEAs may contain an array of grooves in the faces thereof that define a reactant flow field for distributing the fuel cell's gaseous reactants (i.e., hydrogen and oxygen in the form of air) over the surfaces of the respective cathode and anode. These reactant flow fields generally include a plurality of lands that define a plurality of flow channels therebetween through which the gaseous reactants flow from a supply header at one end of the flow channels to an exhaust header at the opposite end of the flow channels (Paragraph 0004). Therefore it would have been obvious to one of ordinary skill in the art to incorporate grooves in the faces of the plates of Lee et al. into the fuel cell of Kenyon et al. because Lee et al teach that the MEAs may contain an array of grooves in the faces thereof that define a reactant flow field for distributing the fuel cell's gaseous reactants (i.e., hydrogen and oxygen in the form of air) over the surfaces of the respective cathode and anode. (Paragraph 0004).

With respect to an outer periphery of the grooves being opened to an outer periphery of the porous oxygen passage plate and not extending to an therefore being closed to the central bore, Kenyon et al. teach that each of the diffusion cell units **39** includes a moisture permeable membrane **55**, a first upper layer of diffuser material **56** "oxygen passage plate" second upper layer of diffuser material **57** "oxygen passage plate" above the layer **56**, and a lower layer of diffuser material **58** on the side of the

membrane **55** opposite to the side at which the diffuser material layers **56** and **57** are located. An inner ring gasket **60** engages with the membrane **55** to seal off the inner periphery of the diffusion cell unit from the flow channel **35** "seals off oxygen plate from central bore" except at the exposed inner periphery of the lower diffuser layer **58** "fuel passage plate". A ring shaped outer gasket **61** is engaged with the membrane **55** at the outer periphery of the diffusion cell unit and seals off the bottom diffuser layer **58** from the outside air (Col 5 lines 34-67).

With respect to claim 5, Kenyon et al disclose a passive air breathing fuel cell wherein the outer peripheral surface is rectangular in shape see Fig. 6.

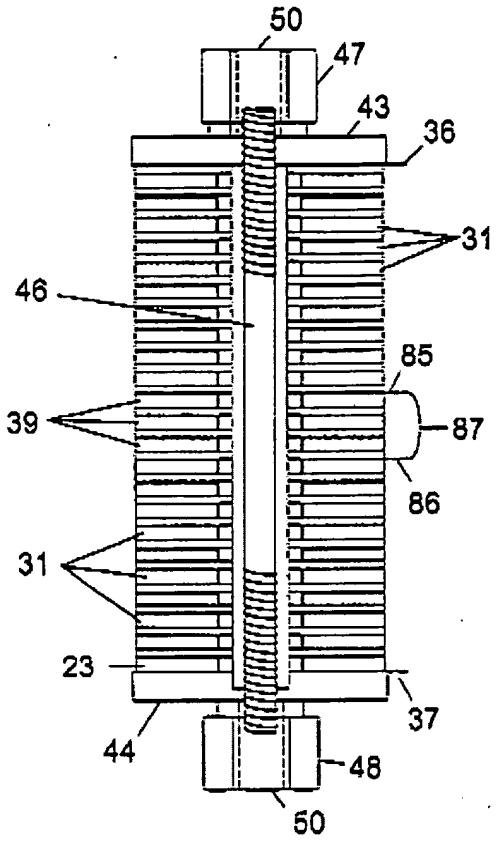

Fig. 6

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kenyon et al. (U.S. Patent No. 6,423,437 B1) as applied to claim 1 above in view of Reiser (U.S. Patent No. 6,497,971 B1).

With respect to claim 2, Kenyon et al. disclose a passive air breathing fuel cell in paragraph 2 above. Kenyon et al. does not specifically teach wherein blowers for blasting an air into the grooves formed on the oxygen passage plates are provided on the fuel cell to face the grooves. However Reiser discloses a method and apparatus for improved delivery of input reactants to a fuel cell assembly wherein the fuel cell stack

assembly includes a plurality of individual fuel cells each having an electrolyte, cathode and anode, and the cell stack assembly is adapted for defining anode flow fields for exposing the anodes to a fuel, cathode flow fields for exposing the cathodes to an oxidant, and for preventing the commingling of the fuel and oxidant reactants between adjacent anodes and cathodes. Also included are input and output manifolds in fluid communication with the cathode flow fields, and at least one blower mounted with one of the manifolds for flowing oxidant through the cathode flow fields (Col 2 lines 30-45). Therefore it would have been obvious to one of ordinary skill in the art to incorporate the blowers of Reiser into the fuel cell system of Kenyon et al. because Reiser teach that mounting the blowers 17 with the fuel cell apparatus is considered to have several advantages. The blowers can be low power, relatively quiet, and include variable speed motors, such as a variable speed a.c. or d.c. motors, that can be controlled to tailor the flow of oxidant in accordance with the individual needs of the fuel cell stack assembly 10 (Col 4 lines 21-45).

4. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kenyon et al. (U.S. Patent No. 6,423,437 B1) in view of Reiser (U.S. Patent No. 6,497,971 B1) as applied to claim 2 above.

With respect to claims 3 and 4, Kenyon et al. as modified by Reiser disclose a passive air breathing fuel cell in paragraph 5 above. Kenyon et al. as modified by Reiser does not specifically teach wherein blowers are arranged in opposition to the both opened ends of the grooves. However, it would have been obvious to one of

ordinary skill in the art to incorporate the blowers of that are arranged in opposition to the both opened ends of the grooves of the fuel cell of Kenyon et al as modified by Reiser because this fuel cell is circular and the placement of extra blowers to provide air to the oxygen passages on the opposite side would increase the performance of the fuel cell because having blowers on one side only would not adequately supply air to the oxygen passages on the opposite side of this circular fuel cell.

Response to Arguments

5. Applicant's arguments filed on January 12th, 2007 have been fully considered but they are not persuasive.

Applicant's principle arguments are

(a) Applicants respectfully submit that it would not have been obvious to combine a member from a fuel cell of the active type as disclosed in Lee with a fuel cell of a passive type as per Kenyon, having a structure fundamentally different from that of Lee.

In response to Applicant's arguments, please consider the following comments.

(a) Kenyon et al. do not specifically teach wherein the oxygen passage plate comprises a plurality of opened grooves on a surface thereof opposed to the oxygen electrode, and the grooves are opened outside at both ends thereof. However Lee et

al. discloses a cooling system for a fuel cell stack wherein the electrically conductive plates sandwiching the MEAs may contain an array of grooves in the faces thereof that define a reactant flow field for distributing the fuel cell's gaseous reactants (i.e., hydrogen and oxygen in the form of air) over the surfaces of the respective cathode and anode. These reactant flow fields generally include a plurality of lands that define a plurality of flow channels therebetween through which the gaseous reactants flow from a supply header at one end of the flow channels to an exhaust header at the opposite end of the flow channels (Paragraph 0004). Therefore it would have been obvious to one of ordinary skill in the art to incorporate grooves in the faces of the plates of Lee et al. into the fuel cell of Kenyon et al. because Lee et al teach that the MEAs may contain an array of grooves in the faces thereof that define a reactant flow field for distributing the fuel cell's gaseous reactants (i.e., hydrogen and oxygen in the form of air) over the surfaces of the respective cathode and anode. (Paragraph 0004).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ben Lewis whose telephone number is 571-272-6481. The examiner can normally be reached on 8:30am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ben Lewis

PATRICK JOSEPH RYAN
SUPERVISORY PATENT EXAMINER

Patent Examiner
Art Unit 1745